

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Withdrawn) A plasma processing apparatus for supplying radio-frequency power into a process chamber so as to generate plasma, to thereby treat an object to be processed with the plasma;

wherein the process chamber has a top plate which is disposed opposite to the object to be processed, through the medium of a region for generating the plasma; and a radio-frequency antenna is disposed in the inside and outside of the process chamber so that the radio-frequency antenna is wound around the top plate.

2. (Withdrawn) A plasma processing apparatus according to claim 1, wherein at least one metal-based radio-frequency antenna is disposed, in the process chamber, so as to provide a linear and/or curved line.

3. (Withdrawn) A plasma processing apparatus according to claim 1, wherein the radio-frequency antenna disposed in the process chamber is covered with an insulating material so that the radio-frequency antenna does not directly contact the plasma.

4. (Withdrawn) A plasma processing apparatus according to claim 1, wherein the length of the radio-frequency antenna disposed in the process chamber is not smaller than $(n/2-1/4)\lambda_0$ (wherein λ_0 is the wavelength of the radio-frequency power, and n is an integer) and not larger than $(n/2+1/4)\lambda_0$.

5. (Withdrawn) A plasma processing apparatus according to claim 1, wherein the thickness or diameter of the radio-frequency antenna disposed in the process chamber is changed along with the propagation direction of the radio-frequency power.

6. (Withdrawn) A plasma processing apparatus according to claim 1, wherein the radio-frequency antenna is disposed in the process chamber, so that the density of the radio-frequency antenna arrangement is changed with respect to the central portion and peripheral portion of the process chamber, and/or with respect to the height direction of the process chamber.

7. (Withdrawn) A plasma processing apparatus according to claim 3, where an insulating fluid is circulated between the radio-frequency antenna disposed in the process chamber, and the insulating material.

8. (Withdrawn) A plasma processing apparatus according to claim 1, wherein the distance between the top plate and the radio-frequency antenna disposed in the process chamber is variable.

9. (Withdrawn) A plasma processing apparatus according to claim 1, wherein a measuring device is disposed in at least one position of the top plate so as to monitor the state of the generated plasma.

10. (Withdrawn) A plasma processing apparatus according to claim 1, wherein the top plate has a plurality of apertures for passing a gas to be supplied to the process chamber.

11. (Withdrawn) A plasma processing apparatus according to claim 1, wherein a susceptor for supporting the object to be processed is disposed in the process chamber, and a bias is applied to the susceptor.

12. (Withdrawn) A plasma processing apparatus according to claim 1, wherein at least a portion of the ground line in the process chamber has an opening, and the plasma is generated due to the radiation of a microwave electric field from the opening toward the outside of the ground line.

13. (Currently Amended) A plasma processing apparatus for supplying radio-frequency power into a process chamber so as to generate plasma, to thereby treat an object to be processed with the plasma;

wherein the process chamber has a top plate which is disposed opposite to the object to be processed through the medium of a region for generating the plasma; the top plate comprising a metal-based or silicon-based material;

wherein a plurality of metal-based inductively coupled radio-frequency antennas are disposed in the process chamber[[,]] to provide linear lines, electric current flows in each of the antennas in one direction so that the directions of the respective electric currents in ~~adjacent~~ plural antennas are the same, induction electric fields due to the electric currents in the plural antennas are strengthened by each other on a basis of interactions therebetween; and the adjacent antennas are in parallel with each other on the same plane which is parallel to the object to be processed;

wherein the process chamber has a first chamber wall having a plurality of antennas so that the antennas penetrate the first chamber wall into the inside of the process chamber; [[and]]

wherein the radio-frequency antennas disposed in the process chamber are covered with an insulating material so that the radio-frequency antennas do not directly contact the plasma; and

wherein said radio-frequency power is distributed by a distributor so that the radio-frequency power can be supplied into the process chamber from said plurality of antennas.

14-15. (Canceled)

16. (Previously Presented) A plasma processing apparatus according to claim 13, wherein the length of the radio-frequency antenna disposed in the process chamber is not smaller than $(n/2-1/4)\lambda_0$ (wherein λ_0 is the wavelength of the radio-frequency power, and n is an integer) and not larger than $(n/2+1/4)\lambda_0$.

17. (Previously Presented) A plasma processing apparatus according to claim 13, wherein the thickness or diameter of the radio-frequency antenna disposed in the process chamber is changed along with the propagation direction of the radio-frequency power.

18. (Withdrawn) A plasma processing apparatus according to claim 14, wherein the radio-frequency antenna is disposed, in the process chamber, so that the density of the radio-frequency antenna arrangement is changed with respect to the central portion and peripheral portion of the process chamber, and/or with respect to the height direction of the process chamber.

19. (Previously Presented) A plasma processing apparatus according to claim 13, where an insulating fluid is circulated between the radio-frequency antenna disposed in the process chamber, and the insulating material.

20. (Withdrawn) A plasma processing apparatus according to claim 14, wherein the distance between the top plate and the radio-frequency antenna disposed in the process chamber is variable.

21. (Previously Presented) A plasma processing apparatus according to claim 13, wherein a measuring device is disposed in at least one position of the top plate so as to monitor the state of the generated plasma.

22. (Previously Presented) A plasma processing apparatus according to claim 13, wherein the top plate has a plurality of apertures for passing a gas to be supplied to the process chamber.

23. (Previously Presented) A plasma processing apparatus according to claim 13, wherein a susceptor for supporting the object to be processed is disposed in the process chamber, and a bias is applied to the susceptor.

24. (Withdrawn) A plasma processing apparatus according to claim 14, wherein at least a portion of the ground line in the process chamber has an opening, and the plasma is generated due to the radiation of a microwave electric field from the opening toward the outside of the ground line.

25. (Previously Presented) A plasma processing apparatus according to claim 13, wherein induction electric fields due to respective electric currents in the plurality of antennas are strengthened by each other.

26. (Previously Presented) A plasma processing apparatus according to claim 13, wherein the process chamber has a second chamber wall opposed to the first chamber wall, and each antenna penetrates the first chamber wall and the second chamber wall.